**Hard Knocks**

Head injuries among football players are rising and the after-effects are more serious than previously thought. Is football just too dangerous?

By *Alan Schwarz*

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Owen Thomas started playing football when he was years old. From the beginning, he enjoyed the rough-and-tumble of the game.

"He loved to go into practice and hit really hard," recalls his mother, Kathy Brearley.

Over time, those hits added up and appear to have taken a terrible toll. In April, Thomas—a junior at the University of Pennsylvania and a lineman on its football team—took his own life. The autopsy showed that his brain was in the early stages of chronic traumatic encephalopathy, more commonly known as C.T.E.

C.T.E. is a head-trauma-induced disease linked to depression, impulse-control problems, memory loss, and dementia. More than 20 deceased N.F.L. players have been found to have had C.T.E.

But its discovery in a 21-year-old who had never even been diagnosed with a concussion raises big questions about the dangers of football, especially for the 1.4 million high school students and 3 million younger kids who play.

If this debilitating brain disease can be caused by repeated hits to the head that don't rise to the level of a concussion—an intrinsic part of football at every level—is it even possible to make the game safe? In general, there's an increasing awareness about the dangers of concussions—especially for younger players whose brains are still developing.

In September, an 11-year-old football player from Muskego, Wisconsin, died suddenly. He had sustained a concussion in a game and then, several days later, collapsed after accidentally hitting his head during recess. Doctors call it second-impact syndrome. Particularly among young people, sustaining another blow to the head—even a seemingly harmless one—before a first has healed can be fatal.

At least 32 high school and youth football players were killed by or suffered permanent brain damage from head injuries from 2006 through 2009, according to the National Center for Catastrophic Sport Injury Research at the University of North Carolina. That's almost twice the total from the previous four-year period. (In October, a collision during a game left a Rutgers University player paralyzed from the neck down.)

Alarmed by these incidents, many states have adopted or are considering strict rules about how and when public school players can be cleared to return to play after a concussion, as well as requiring concussion awareness programs for players, coaches, and parents. Congress has been holding hearings and considering similar national legislation.

**'Brain Damage, Pure and Simple'**

"More and more of my colleagues in Congress are realizing what so many families across the country have realized," says Congressman Bill Pascrell of New Jersey. "A concussion is brain damage, pure and simple." But most high school football players don't see it that way, and many teens are unsure about what constitutes a concussion. Contrary to popular belief, you don't always pass out when you've sustained a concussion; other symptoms include confusion, disorientation, and nausea.

And because football's gladiator culture encourages playing through pain and taking a hit for the team, many teens don't want to risk being put on the sidelines by telling their coaches when they think they might have a concussion.

Concussions are more dangerous for teenagers because, studies show, their brain tissue is less developed than adults' and more easily damaged. High school players also typically receive less expert medical care than college or pro players, or none at all.

There's also the question of helmets. Many young players use old safety gear that's been passed down long past its prime. And even new helmets are designed to prevent only skull fractures, not concussions.

So what can be done to make football safer? Improving helmet technology is a good place to start. Better still, doctors say, coaches need to do a better job of making sure any player with a head injury stays off the field long enough for the injury to fully heal.

But medical experts say the most important change is to reduce the overall number of hits to the head—in practice as well as in games. Football is probably the most practice-intensive team sport—one recent study found that a college football player participates in an average of 12 practices for every game played—and players often sustain hits during practice.

"We can, and we must, develop brain trauma guidelines similar to the pitch-count regulations now used in Little League Baseball," says Dr. Robert Cantu, a professor of neurosurgery at Boston University. "We count the pitches of every baseball player to ensure a small number do not develop shoulder and elbow problems—and yet we don't count how often children get hit in the head playing football."

In an effort to prevent some of the more harmful hits, the N.F.L. has started to crack down on players who violate existing rules against unnecessary or intentional hits, fining them and threatening to suspend them. The N.F.L. is also considering ways to change the frequency and structure of its practices to reduce head trauma. Those who love the game are hopeful that all these changes will make a difference.

"I definitely think the game can be made safer," says Michael Oriard, a former N.F.L. player who has written several books about the game. "But can it be made safe enough? I'm not so sure."

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